AUTOTYPE SORGHUM GRAIN FOR BREWING

D. A. Aba[1] and S.A. Bello[2]

Department of Plant Science
Institute for Agricultural Research, Ahmadu Bello University, Zaria

[2]Cereal Development Manager
Guinness Nigeria PLC.

We want sorghum grain that:

- Threshes glume free (1-2% glume attached maximum)
- High purity (less admixture, less foreign matters, e.g. sand, plant parts etc)
- Stores well
- Has large even kernels
- Is low in or devoid of tannin
- Mills easily without the production of too much flour (i.e. has right degree of mealiness).

In addition to the above, sorghum grain for malting needs:

- Ready and even germination
- Easy hydration in steep
- Acceptable malting loss (8 - 10% but not ≥ 15%)
- Even endosperm modification
- Good protein modification (i.e. easy conversion of ≥ 40% of the grain protein to the soluble form during malting.
- Good proportion (20-25%) of the malting soluble nitrogen to be present as Free Amino Nitrogen (FAN).
- Acceptable α amylase content in the malt (≥ 40 DU, dry weight basis)
- Acceptable diastatic power (at least 50°L or 160 WK)
- Good wort fermentability

"Sorghum Grain Handling (at Farm and Farm House/Shed) to Impact on Quality and Market Value"

In addition to the "CHOICE OF VARIETY" a farmer can enhance the quality and therefore the value of his sorghum grain for industrial use.

Through: Careful production, harvesting, threshing, practices and to some extent storage practices which include bagging.

Production: Weedy plot may produce less plumb/bold grain; has higher chances of introducing other plant parts into harvest (clean yield, clean harvest).

Harvesting: Separate panicles of different colors,

- Do not include plant parts-either of sorghum or other plants.

Threshing: Dry adequately before threshing to allow for:

- Low glume level max 2% i.e out of every hundred sorghum grain in the bag only 2 is allowed to carry glumes.
- Further separate coloured heads or panicles. Note: white in a yellow lot is coloured Yellow in a white lot is coloured.
- Don't eat-in plant parts
- Don't introduce sand/soil/stones (thresh on hard surface)
- Avoid broken kernels max 2% (we shall quantify this).
- Storage (including bagging)
- Careful storage to minimise infestation
- Use good, not waste/broken bags that waste grain from farm gate to market place if 3 kg is lost before market, at ₦1,500 per 100kg you have lost ₦45 = the best bag is lest than ₦45.

Numerical Evaluation of Sorghum Grain

(1) Moisture -> 9-11% range
0.1% above range = -1 mark
0.1% below range = +1 mark

(2) Glumes attached to grains -> 2% maximum
0.1% above = -1 mark
0.1% below = +1 mark

(3) Foreign Matter (including free calyx)
NK %
NK% = +1 mark
0.1% above = -1 mark
(NK = No calys)

(4) Soundness:
(a) Weevil Damaged -> 1% maximum
1% = +1 mark
0.1% below = -1 mark

(b) Broken kernels -> 2% maximum
2% = +1 mark
0.1% above = -1 mark
0.1% below = +1 mark

(5) Variety/purity by colour

	Farafara	Factor	Kaura	Factor
White	90% min	±0.2	1% max	+0.1
Yellow:	1% max	±0.1	90% min	+0.2
Brown:	1% max	-1	1% max	-1
Discolored:	1% max	-2	1% max	-2
Red	1% max	-3	1% max	-3

Note: (a) For brown, discoloured and Red, multiply % in excess of 1 by the negative factor.
(b) For % < 1, multiply the difference by the appropriate positive factor.

(6) Thousand Kernel Weight (TKW)
Fara-fara = 32 grammes *min*
Kaura = 35 grammes min
1 gramme above = +1 mark
1 gramme less = - 1 mark

(7) Other quality attributes scored are:-
Brightness 0-5 mark
Odour -5 to +5 marks
Mould, etc.

Scores Interpretation
Acceptable: > +10
Acceptable with penalty (surcharge): -10 to +9
Reject: < -1

be divided in two ways:

1. Primary cleaning - on the farm
2. Secondary cleaning

Primary Cleaning

This involves various activities carried out in the farm at the point of harvest and it includes:

- Allow your grain to dry before you clean
- Concrete slabsort
- Threshing
- Winnowing
- Sieving - using manual sieves
- Some times hand picking of dirt
- Proper processing

However this is not effective due to:

- Use of improper threshing facilities (threshing on bare ground). Through this dust, stones and other debris are picked along with the grains
- Dishonesty of farmers who want to increase the quantity of their output by their deceptive act of adding debris in it.
- Educational level of the farmer, which are in most cases very inadequate.

Secondary Cleaning (Using Machine)

This involves passing the grains through machines that clean the grains, to give very fine and cleaned grains, which are ready for factory use. This is, basically through the use of high volume of air combined within other mechanism.

- It is very effective
- End products are ready for factory use
- It Is very precise
- It is also quick
- Cost less
- Helps to improve the grains quality thereby increasing it's market value

Some impurities removed are:

- Glumes

- Big stones
- Fine stones (removed with the help of destoners)
- Unwanted grain (e.g., maize, soyabean, etc.)
- Sand
- Chaff
- Weevils
- Others impurities (such as metal, money, debris etc)

Note: The level of cleaning depends on the companies specification. In Nalmaco we cleaned to our client's specification.

Suggestion

- Use of concrete slabs for threshing by the farmers
- Proper education of the farmers on the need to clean their products before sale.
- Proper pricing of the product by companies to avoid dishonesty by farmers and the middlemen.
- Contribute to buy machine
- Make sure the grains are dried before threshing.

Conclusion

Considering the various use of sorghum grain, which are too many, we need to pay good attention on its proper handling and processing (cleaning), so as to avoid food poisoning or contamination, bearing in mind that the life of children are also involved.